UNITED STATES PATENT AND TRADEMARK OFFICE

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EXAMINER
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ART UNIT	PAPER NUMBER
2615	

NOTIFICATION DATE	DELIVERY MODE
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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PTOL-90A (Rev. 04/07)

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☒ Responsive to communication(s) filed on <u>14 June 2006</u>.

2a) ☐ This action is **FINAL**.   2b) ☒ This action is non-final.

3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) ☒ Claim(s) <u>1-28</u> is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5) ☐ Claim(s) _____ is/are allowed.

6) ☒ Claim(s) <u>1-28</u> is/are rejected.

7) ☐ Claim(s) _____ is/are objected to.

8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) ☐ The specification is objected to by the Examiner.

10) ☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a) ☒ All   b)☐ Some * c)☐ None of:

      1. ☒ Certified copies of the priority documents have been received.

      2. ☒ Certified copies of the priority documents have been received in Application No. <u>10/582,862</u>.

      3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
    Paper No(s)/Mail Date <u>6/14/2006</u>.

4) ☐ Interview Summary (PTO-413)
    Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____ .

DETAILED ACTION

Claim Rejections - 35 USC § 103

1.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2.   Claims 1-3, 5-8, 11, 13-16, 18-24, 26-28 are rejected under 35 U.S.C. 103(a) as

being unpatentable over Elliot et al, US Patent 5,727,066.

Re Claim 1, Elliott et al discloses the method comprising, for input signals to the

speakers, a process of reducing crosstalk that, within the case, occurs between the

speakers (*fig. 10*). Elliott et al does not explicitly disclose a speaker-characteristic

compensation method for a mobile terminal device having at least two speakers in a

case. Official notice is taken that both the concept and advantages of a mobile terminal

device with speakers is well known in the art. It would have been obvious to use the

method of speaker-characteristic compensation method in a mobile terminal to reduce

crosstalk.

Re Claim 2, Elliott et al discloses the speaker-characteristic compensation

method according to claim 1, wherein the process includes a step of adding to an input

signal to the other speaker a reduction signal for reducing a sound that, within the case,

leaks from the one speaker into the other speaker (*abstract; fig. 10*).

Re Claim 3, Elliott et al disclose the speaker-characteristic compensation method according to claim 2, wherein the reduction signal is created through processing of an input signal to the one speaker (*fig. 10*).

Re Claim 5, Elliott et al discloses the speaker-characteristic compensation method apparatus according to claim 1, the process comprising: a first direct processing step of processing an input signal to be a direct component to the other speaker (*fig. 10: H11*); a first cross processing step of processing an input signal to the one speaker, thereby obtaining a cross component to the other speaker (*fig. 10: H21*); a first addition step of adding respective signals obtained through the first direct processing step and the first cross processing step, thereby creating a driving signal for driving the other speaker (*fig. 10: adder*); a second direct processing step of processing an input signal to be a direct component to the one speaker (*fig. 10: H22*); a second cross processing step of processing an input signal to the other speaker, thereby obtaining a cross component to the one speaker (*fig. 10: H12*); and a second addition step of adding respective signals obtained through the second direct processing step and the second cross processing step, thereby creating a driving signal for driving the one speaker (*fig. 10: adder*).

Re Claim 6, Elliott et al discloses the speaker-characteristic compensation method according to claim 5, wherein the first direct processing step is based on a transfer characteristic through which a driving signal for driving the one speaker is transformed by at least an amplifier characteristic or a speaker characteristic and emitted from the one speaker (*fig. 10: H11*), the first cross processing step is based on

a transfer characteristic through which a driving signal for driving the one speaker is transformed by at least acoustic coupling and emitted from the other speaker (*fig. 10: H21*), the second direct processing step is based on a transfer characteristic through which a driving signal for driving the other speaker is transformed by at least an amplifier characteristic or a speaker characteristic and emitted from the other speaker (*fig. 10: H22*), and the second cross processing step is based on a transfer characteristic through which a driving signal for driving the other speaker is transformed by at least acoustic coupling and emitted from the one speaker (*fig. 10: H12*).

Re Claim 7, Elliott et al discloses the speaker-characteristic compensation method according to claim 5, comprising a post-processing step of further processing a signal, to the other speaker, that has been obtained through addition in the first addition step, in order that a speaker emission signal emitted from the other speaker coincides in amplitude or phase with an input signal to the other speaker (*fig. 10: Delay, reconstruction filter etc..*).

Re Claim 8, Elliott et al discloses the speaker-characteristic compensation method according to claim 5, comprising a pre-processing step of, prior to the first direct processing step and the first cross processing step, processing an input signal to the other speaker so that a speaker emission signal emitted from the other speaker coincides in amplitude or phase with the input signal to the other speaker (*fig. 10: Delay, reconstruction filter etc..*).

Re Claim 11, Elliott et al discloses the speaker-characteristic compensation method according to claim3, wherein an input signal to the one speaker is processed in

accordance with the correlation between the input signal to the one speaker and an input signal to the other speaker, the correlation being obtained per frequency component (*fig. 10: C21 & C12*).

Re Claim 13, Elliott et al disclose the speaker-characteristic compensation method according to claim 5, wherein the direct processing steps for the other and the one speaker or the cross processing steps for the other and the one speaker are approximately equivalent (*fig. 10: C11, C21 & C12, C22*).

Claim 14 has been analyzed and rejected according to claim 1.

Claim 15 has been analyzed and rejected according to claim 2.

Claim 16 has been analyzed and rejected according to claim 3.

Claim 18 has been analyzed and rejected according to claim 5.

Claim 19 has been analyzed and rejected according to claim 6.

Claim 20 has been analyzed and rejected according to claim 7.

Claim 21 has been analyzed and rejected according to claim 8.

Claim 22 has been analyzed and rejected according to claim 9.

Claim 23 has been analyzed and rejected according to claim 10.

Claim 24 has been analyzed and rejected according to claim 11.

Claim 26 has been analyzed and rejected according to claim 13.

Re Claim 27, Elliott et al disclose a speaker-characteristic compensation method, for a mobile terminal device having N speakers contained in a case (*fig. 1*), in which a

speaker emission signal Si emitted from i-th speaker is given by Equation 31, by means

of a matrix H including a transfer characteristic Hij through which a driving signal Sdi for

driving the i-th speaker is transformed by at least inner-case acoustic coupling and

emitted from j-th speaker, and a transfer characteristic Hii through which a driving signal

Sdi for driving the i-th speaker is transformed by at least an amplifier characteristic or a

speaker characteristic and emitted from the i-th speaker (_col. 4, lines 18-31; col. 5, eq._

_1_),

$$
\begin{array}{l}
S1 \\
S2 \\
\cdots \\
SN
\end{array}
= HSd =
\begin{array}{cccc}
H11 & H21 & \cdots & HN1 \\
H12 & H22 & \cdots & HN2 \\
& & & \cdots \\
H1N & H2N & \cdots & HNN
\end{array}
\begin{array}{l}
Sd1 \\
Sd2 \\
\\
Sdn
\end{array}
$$

(31)

wherein the driving signal Sdi for the i-th speaker is created by processing an input

signal Xi for the i-th speaker with a filter characteristic G, given by Equation 32, that is

based on a cofactor Qij of an (i, j) component of the matrix H (_col. 4, lines 18-31; col. 5,_

eqs. 2, 3).

$$
\begin{array}{l}
Sd1 \\
Sd2 \\
\cdots \\
Sdn
\end{array}
= G
\begin{array}{l}
Y1 \\
Y2 \\
\cdots \\
YN
\end{array}
\text{ where } G = a
\begin{array}{cccc}
Q11 & Q12 & \cdots & Q1N \\
Q21 & Q22 & \cdots & Q2N \\
& \cdots & & \\
QN1 & QN2 & \cdots & QNN
\end{array}
$$

Claim 28 has been analyzed and rejected according to claim 27.

Claim Rejections - 35 USC § 103

1.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set
> forth in section 102 of this title, if the differences between the subject matter sought to be patented and
> the prior art are such that the subject matter as a whole would have been obvious at the time the
> invention was made to a person having ordinary skill in the art to which said subject matter pertains.
> Patentability shall not be negatived by the manner in which the invention was made.

2.   The factual inquiries set forth in *Graham* v. *John Deere Co.*, 383 U.S. 1, 148

USPQ 459 (1966), that are applied for establishing a background for determining

obviousness under 35 U.S.C. 103(a) are summarized as follows:

    1.   Determining the scope and contents of the prior art.
    2.   Ascertaining the differences between the prior art and the claims at issue.
    3.   Resolving the level of ordinary skill in the pertinent art.
    4.   Considering objective evidence present in the application indicating
          obviousness or nonobviousness.

3.   Claims 4, 10 & 17 are rejected under 35 U.S.C. 103(a) as being unpatentable

over Elliott et al as applied to claim 3 above, and further in view of Katayama et al, US

Patent 6,546,105 B1.

    Re Claim 4, Elliott et al discloses the speaker-characteristic compensation

method according to claim 3, wherein an input signal to the one speaker is processed

based on a characteristic obtained by dividing a transfer characteristic, through which a

driving signal for driving the one speaker is transformed by at least acoustic coupling

and emitted from the other speaker, by a transfer characteristic, through which a driving

signal for driving the other speaker is transformed by at least an amplifier characteristic

or a speaker characteristic and emitted from the other speaker, and by reversing the

sign of said characteristic. However, Katayama et al does (*fig. 5: 12; col. 14, line 66 though col. 15, line 9*).

Taking the combined teachings of Elliott et al and Katayama et al as a whole, one skilled in the art would have found it obvious to modify the speaker-characteristic compensation method according of Elliott et al with wherein an input signal to the one speaker is processed based on a characteristic obtained by dividing a transfer characteristic, through which a driving signal for driving the one speaker is transformed by at least acoustic coupling and emitted from the other speaker, by a transfer characteristic, through which a driving signal for driving the other speaker is transformed by at least an amplifier characteristic or a speaker characteristic and emitted from the other speaker, and by reversing the sign of said characteristic as taught in Katayama et al (*fig. 5: 12; col. 14, line 66 though col. 15, line 9*) for computing filter coefficients.

Re Claim 10, the combined teachings of Elliott et al and Katayama et al disclose the speaker-characteristic compensation method according to claim 4, wherein an input signal to the one speaker is processed based on a characteristic obtained by adding a low-pass filter to said characteristic (*Elliott et al, fig. 10: LPF*).

Claim 17 has been analyzed and rejected according to claim 4.

Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Elliott et al as applied to claim 3 above, and further in view of Ueno et al, US Patent 5,960,390.

Re Claim 9, Elliott et al discloses the speaker-characteristic compensation method according to claim 3, but fails to disclose wherein an input signal to the one

speaker is processed per subband of the input signal to the one speaker. However, Ueno et al does (*fig. 5: 101*).

Taking the combined teachings of Elliott et al and Ueno et al as a whole, one skilled in the art would have found it obvious to modify the speaker-characteristic compensation method of Elliott et al with wherein an input signal to the one speaker is processed per subband of the input signal to the one speaker as taught in Ueno et al (*fig. 5: 101*) to break the signals into a number of different frequency bands and process each one independently.

Claims 12 & 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Elliott et al as applied to claim 3 above, in view of Baumgarte et al, US Patent Pub. 2003/0219130 A1, and further in view of Nakayama, US Patent 4,700,389.

Re Claim 12, Elliott et al discloses the speaker-characteristic compensation method according to claim 3, but fails to disclose wherein an input signal to the one speaker is processed based on a characteristic obtained by multiplying by a scalar value of smaller than one the input signal to the one speaker. However, Baumgarte et al does (*para 0047*).

The combined teachings of Elliott et al and Baumgarte et al fail to disclose reversing the sign of the resultant signal, however, Nakayama does (*fig. 2: 14b; col. 8, line 48 through col. 9, line 7*).

Taking the combined teachings of Elliott et al, Baumgarte et al and Nakayama as a whole, one skilled in the art would have found it obvious to modify the speaker-

characteristic compensation method according to Elliott et al with wherein an input

signal to the one speaker is processed based on a characteristic obtained by multiplying

by a scalar value of smaller than one the input signal to the one speaker as taught in

Baumgarte et al (*para 0047*) with reversing the sign of the resultant signal as taught in

Nakayama (*fig. 2: 14b; col. 8, line 48 through col. 9, line 7*) to reduce the perceptual

similarity of the signals and effective to produce perceived natural enlargement of the

sound field.

Claim 25 has been analyzed and rejected according to claim 12.

Contact

Any inquiry concerning this communication or earlier communications from the

examiner should be directed to George C. Monikang whose telephone number is 571-

270-1190. The examiner can normally be reached on M-F. alt Fri. Off 7:30am-5:00pm

(est).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, Chin Vivian can be reached on 571-272-7848. The fax phone number for

the organization where this application or proceeding is assigned is 571-273-8300.

VIVIAN CHIN
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800

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George Monikang　　　　　　　　　　　　　　　　　　4/29/2007

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